

WHAT IS CLAIMED IS:

1. A method of removing contamination from a Fischer-Tropsch derived hydrocarbon stream, the method comprising:
 - a) passing a Fischer-Tropsch derived hydrocarbon stream to a treatment zone;
 - b) passing an aqueous acidic stream to the treatment zone;
 - c) contacting the Fischer-Tropsch derived hydrocarbon stream with the aqueous acidic stream in the treatment zone to form a mixed stream; and
 - 10 d) separating the mixed stream into at least one extracted Fischer-Tropsch derived hydrocarbon stream, and at least one modified aqueous acidic stream.
2. The method of claim 1, wherein the contacting step forms a third phase substantially distinct from the at least one extracted Fischer-Tropsch derived hydrocarbon stream and the at least one modified aqueous acidic stream, and wherein the aqueous acidic stream extracts contamination from the Fischer-Tropsch derived hydrocarbon stream and isolates it in the third phase.
3. The method of claim 1, wherein the contamination comprises an inorganic component.
4. The method of claim 3, wherein the inorganic component comprises at least one element selected from the group consisting of Al, Co, Ti, Fe, Mo, Na, Zn, Si, and Sn.
- 25 5. The method of claim 3, wherein the contamination originates from upstream processing equipment.
6. The method of claim 3, wherein the contamination originates from a catalyst used to produce the Fischer-Tropsch derived hydrocarbon stream.
- 30 7. The method of claim 1, wherein the size of the contamination is such that the contamination may be passed through a 1.0 micron filter.

8. The method of claim 1, wherein the contacting step is performed as a batch process.
- 5 9. The method of claim 1, wherein the contacting step is performed as a continuous process.
10. The method of claim 1, wherein the aqueous acid stream comprises an acid dissolved in water, and wherein the concentration of the acid in the water ranges from about 0.0001 to 1 M.
11. The method of claim 10, wherein the concentration of the acid in the water ranges from about 0.01 to 0.1 M.
- 15 12. The method of claim 1, wherein the aqueous acidic stream comprises an organic acid dissolved in water, the organic acid selected from the group consisting of formic acid, acetic acid, propionic acid, butyric acid, and oxalic acid.
- 20 13. The method of claim 1, wherein the aqueous acidic stream comprises an inorganic acid dissolved in water, the inorganic acid selected from the group consisting of hydrochloric acid, sulfuric acid, and nitric acid.
14. The method of claim 1, wherein the aqueous acidic stream comprises reaction water produced in a Fischer-Tropsch hydrocarbon synthesis.
- 25 15. The method of claim 14, wherein the reaction water comprises acetic acid.
16. The method of claim 1, wherein the extraction step is performed in a mixing apparatus.

30

17. The method of claim 16, wherein the mixing apparatus is selected from the group consisting of a mixing valve, an orifice plate, an inline static mixer, an extraction column with sparger, and a commercial mixing apparatus.

5 18. The method of claim 17, wherein the extraction column is selected from the group consisting of a wax bubble column, a two-phase injection, and an acid spray column.

10 19. The method of claim 1, further including the step of filtering the Fischer-Tropsch derived hydrocarbon stream.

20. The method of claim 19, wherein the filtering step is performed after the contacting step.

15 21. The method of claim 1, further including the step of distilling the Fischer-Tropsch derived hydrocarbon stream.

22. The method of claim 1, further including the step of adding a surfactant to the Fischer-Tropsch derived hydrocarbon stream.

20 23. The method of claim 1, further including the step of passing the at least one extracted Fischer-Tropsch derived hydrocarbon stream to a hydroprocessing reactor.

25 24. The method of claim 21, wherein the contacting step substantially reduces plugging of catalyst beds in the hydroprocessing reactor.

25. A method of removing contamination from a Fischer-Tropsch derived hydrocarbon stream, the method comprising:

30 a) passing the Fischer-Tropsch derived hydrocarbon stream to an treatment zone;
b) passing an aqueous acidic stream to the treatment zone;

- c) extracting contamination from the Fischer-Tropsch derived hydrocarbon stream by contacting the Fischer-Tropsch derived hydrocarbon stream with the aqueous acidic stream in the treatment zone at extraction conditions to form a mixed stream; and
- d) separating at least one extracted Fischer-Tropsch derived hydrocarbon stream from a modified aqueous acidic stream and a third phase;

5 wherein after the extraction step the contamination contained in the modified aqueous acidic stream and the third phase is greater than the contamination contained in the extracted Fischer-Tropsch derived hydrocarbon stream.

10 26. The method of claim 25, wherein after the extracting step the contamination contained in the modified aqueous acidic stream and the third phase is at least 10 times greater than the contamination contained in the extracted Fischer-Tropsch derived hydrocarbon stream.

15 27. The method of claim 25, wherein the extraction conditions include a temperature ranging from about 200 to 600°F and a residence time ranging from about 10 seconds to 5 days.

20 28. The method of claim 25, further including the step of filtering the Fischer-Tropsch derived hydrocarbon stream.

25 29. The method of claim 28, wherein the filtering step is performed after the extracting step.

30 30. The method of claim 25 further including the step of passing the at least one extracted Fischer-Tropsch derived hydrocarbon stream to a hydroprocessing reactor.

30 31. The method of claim 30, wherein the extraction step substantially reduces plugging of catalyst beds in the hydroprocessing reactor.

32. A method of removing contamination from a Fischer-Tropsch derived hydrocarbon stream, the method comprising:

- a) passing a syngas to a Fischer-Tropsch reactor to produce a Fischer-Tropsch derived hydrocarbon stream;
- b) providing an additive to the contents of the Fischer-Tropsch reactor to precipitate soluble contamination within the reactor;
- 5 c) filtering the precipitated contamination from the Fischer-Tropsch derived hydrocarbon stream to produce a filtered hydrocarbon stream; and
- d) passing the filtered hydrocarbon stream to a hydroprocessing reactor.

33. The method of claim 32, wherein the additive is selected from the group
10 consisting of an acidic component and a surfactant.